Composites

OLS Betas and Sum Betas are calculated for composites from the historical time series of their returns. The same regressions are performed for the composites and the companies, but with composite returns instead of company returns. Each regression results in a regression beta and a standard error, which can be used in the shrinkage formula.

The peer group beta of a composite is calculated by taking the capitalization weighted average of the peer group betas of the companies that make up the composite.[2] Each adjusted beta is calculated by shrinking the regression beta towards the peer group using the Vasicek formula for the weight.

Levered Beta

A levered beta measures the systematic risk for the equity shareholders of the company. No adjustment is made for the debt financing undertaken by the company. A levered equity beta incorporates the business and financing risks undertaken by the company and born by the equity shareholders.

For each company and for each composite, we calculate the Raw Ordinary Least Squares Beta, Adjusted Ordinary Least Squares Beta, the Adjusted Sum Beta (Including Lag), and estimates of systematic risk.

Unlevered Betas

The unlevered beta (also known as asset beta) removes a company's financing decision from the beta calculation. The unlevered beta reflects a company's business risks. The unlevered beta is computed as follows:

$$\beta_{Ui} = \frac{\beta_{Li}}{1 + \frac{BD_i}{EC_i}(1 - t_i)}$$

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where,

$$BD_i = STD_i + LTD_i + PSTK_i$$

$$EC_i = P_i \times S_i$$

β_{Ui} = the unlevered beta for company *i*;
β_{Li} = the levered beta for company *i*;
BD_i = Book debt for company *i*;
EC_i = Equity capitalization for company *i*;

[2] When analyzing unlevered betas, total value (debt plus equity) weights are used instead of equity value weights.

STD_i = Book value of debt in current liabilities for company i;
LTD_i = Book value of long-term debt for company i;
$PSTK_i$ = Book value of preferred stock for company i;
P_i = Price per common share for company i;
S_i = Common shares outstanding for company i; and,
t_i = Marginal tax rate for company i.

Professor John Graham supplied the necessary marginal tax rate data by company. Recent research by John Graham (1996a, 1996b) demonstrates that the usual approach to estimating the marginal tax rate is prone to substantial measurement error. By modeling the uncertainty of taxable earnings, as well as the major features of the U.S. tax code, Graham shows that only about one-third of Compustat firms have an expected marginal tax rate equal to the top rate. There is substantial variation in tax rates across firms and through time, with up to one-third of firms having a tax rate greater than zero but less than the top statutory rate.

Thus, for the majority of firms, it is inaccurate to assume that they are subject to the top statutory tax rate. For more information or to purchase company tax rate data, please visit our web site at http://valuation.ibbotson.com.

Our model assumes that the state tax rate is 0 percent. Technically, our model should include state taxes. However, state tax regulations vary so greatly that they are difficult to incorporate into a generalized model. For this reason, we have chosen to ignore them.

For each company and for each composite, we calculate the Levered Adjusted Ordinary Least Squares Beta and the Adjusted Sum Beta (Including Lag), and apply the above equation to obtain estimates of unlevered beta.

Costs of Equity Capital

For composite costs of equity in excess of 100 percent or below the risk-free rate of 5.91 percent, NMF will be displayed. It is our opinion that costs of equity below the risk-free rate are not meaningful. It is also our opinion that costs of equity above a certain level are not meaningful. We have chosen this level to be 100 percent.

Costs of equity above 100 percent or below 5.91 percent are included in the percentile statistics because they provide valuable information to the